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POISONINGS
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LITHIUM

- ***Kidney*** - Nephrogenic Diabetes Inspidus, FSGS, AKI
- ***Thyroid*** - Hypothyroidism
- ***CNS*** - Coarse Tremors, dysarthria, nystagmus , Hyperreflexia
- ***CVS*** - Low BP, brady, Blocks, Prolongation of PR or QT

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MONITORING
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- – (for patients taking regular doses) – Thyroid and RFTs 6 monthly
- – Lithium levels (draw sample after 12 hours after the dose)
- – – ***Mild-Moderate toxicity*** – levels 1.5-2.5 mEq/L
- – – ***Severe toxicity*** – levels above 2.5 mEq/L
- ***FINE*** tremors in chronic toxicity, ***COARSE*** in acute toxicity (***side note*** – cyclosporine - coarse tremors)
- Other important points – High Calcium, Low Mg, weight gain

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TOXICITY
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- precipitated by dehydration, diuretics, renal failure and Drugs (NSAIDs, ACE, CCB, Metronidazole, Methotrexate)

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MANAGEMENT
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1. Scene safety and removal
2. ABC and supportive care - give i.v fluids
3. Gastric lavage or whole bowel irrigation
4. ***alkalinization of urine***
5. Hemodialysis (at level above 4, or CNS or CVS features)

- – ***Charcoal is ineffective***
- – ***Lithium contraindicated in Myasthenia and Psoriasis***

DIGOXIN

- used in AFib for rate control (slows AV conduction and stimulate Vagus nerve)
- for inotropics effect (inhibit Na/K ATPase), improves symptoms in failure but doesnt improve mortality
- first order kinetics half life 1.6 days. 25% of plasma drug is protein bound.

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LEVELS
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1. Therapeutic range = 0.5-0.9 nanogram/ml
2. Toxicity = usually above 2 nanagram/ml

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TOXICITY
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is precipitated by

1. ***hypo*** (kalemia, mg, thyroid, thermia)
2. ***Hyper*** (natremia, calcemia)
3. ***Drugs*** (Amiodarone, Verapamil, Beta Blockers, Spironolactone, SSRI, drugs causing Hypokalemia - thiazide and loops)
4. ***Systemic diseases*** – (CKD, MI, Hypothyroidism
5. Advanced age

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FEATURES
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- ***GIT*** (Nausea, vomiting) – *usually the earliest symptoms are GI-symptoms*
- ***CNS*** (Headache, Dizziness, Irritability, yellow vision)
- ***CVS***
- Arrhythmias - could be almost any type

- ECG - PR prolonh, QT shortening, reverse tick down slopping ST depression, inverted T, Tachy brady arrythmias)

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MANAGEMENT
```

1. Scene safety and removal, stop the drug,
2. ABC and supportive care – treat the ppt factor

- – – – ***if present*** – Correct Hypercalcemia, Hypernatremia, Hypomagnesemia
- – – – Keep Potassium in range of 4-5.5

3. Give phenytoin or Lidocain
4. ***Digixin Specific Antibody*** – (Digiband)

- if BP unstable
- Arrythmias (persistent brady or vent Arrythmias)
- Potassium above 5
- Digoxin level above 13nmol
- ingestion more than 10mg

5. General measures - Charcoal, etc

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NOTES
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- – Amiodarone is contraindicated
- – Shock only considered when all else has failed
- – Digoxin contraindicated in amyloisdosis)
- – ***Digiband*** - *exact dose is calculated by serum level, Ingested amount and body weight. if none specified, then in acute toxicity empiric adult dose is 10-20 vials of 40mg, and in chronic toxicity 6 vials of 40mg, prepared in sterile water then diluted in normal saline and given i.v over 20-30 minutes.* – may repeat, and commonly upto 20 vials are needed.

SALICYLATE POISONING

- For exam purpose, scenario usually focus on ABGs - ***mix disorder*** - First Respiratory alkalosis and then HAGMA (High Anion Gap Met Acidosis)

- ***Acute*** – ingestion of 150mg/kg

- ***Acute and severe*** – ingestion of more than 300mg/kg

- ***Chronic*** – Repeated high dose intake

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PRESENTATION
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- ***Resp*** - Tachypnea, hyperventilation, Non-Cardiogenic Pulmonary Edema
- ***CNS*** – Tinnitus (early), Deafness, Seizures, cerebral edema, coma
- ***GIT*** - Nausea, Vomiting, Pain
- ***Electrolytes*** - Low potassium
- ***Others*** – Sweating, Hyperthermia, Rhabdomyolysis, Thrombocytopenia, DIC
- ***RBS*** - can be high or Low

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INVESTIGATIONS
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- Serum levels
- ABGs - ***pH close to normal, HCO below 18, CO2 below 35***
- CBC, LFT, RFT, RBS, Electrolytes
- Urine pH

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TREATMENT
```

1. Scene safety and removal, Stop the exposure
2. ABC and supportive care
3. charcoal if in 1-2 hours – 1gm/kg

- – – *Can also consider Multi-Dose activated charcoal*

4. ***Urinary alkalinization***

- – – if level 450-700 (give soda bicarbonate but ***NEVER*** in cerebral and pulmonary edema)
- – – ***Target*** - Urine pH 7.5-8.5 and Serum pH 7.45-7.55

4. ***Dialysis***

- – – (If involvement of Kidney, heart, CNS)
- Serum level above 700
- Resistant Met Acidosis
- AKI

- Pulmonary Edema
- CNS

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MONITORING
```

- Urine pH - keep above 7.5
- Urine output - more than 1ml/kg/Hour
- Drug level (in mg/L) - below 250 is mild, 250-500 is moderate, 500-700 is severe, above 700 is fatal
- Electrolytes 2-4 H
- – ***level 450-700 mg/L (or 45-70mg/dL*** ➡ Urinary alkalinization – give soda bicarb
- – ***Level above 700 mg/L (or 70mg/dL *** ➡ dialysis
- *– Chronic toxicity often has a lower threshold for dialysis - like 600mg/L (or 60mg/dL)*

PCM OVERDOSE

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PHASES
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1. ***0.5-24 Hours*** – Nausea, Vomiting
2. ***24-72 Hours*** – Abdominal pain, Hepatomegaly, Oliguria
3. ***72-96 Hours*** – Jaundice, Coagulopathy, Encephalopathy and hypoglycemia
4. ***4 Days to 02 weeks*** – Recovery (if patient survives), or progression to death

```
POINTS
```

- dose more than 150mg/kg (or 8-10gm in 24 hours) or Repeated Supratherapeutic doses (more than 4gm/day for more than 48 Hours), ***staggered*** - excessive dose over 24 hours
- – – risk increased if Anorexia nervosa, Alcohol, HIV, taking p450 inducers, Hepatotoxic drugs

- – – Check levels at 4 hour, not earlier

- – – *Normal conjugation is glucoronic acid, when this is saturated, then oxidation occurs - NABQI accumulation which is toxic - conjugation then with glutathione - when glutathione consumed - toxins bind with cell proteins - *Liver and kidney*

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INDICATIONS FOR ACETYLCYSTEINE
```

- (precursor of glutathione)

- Hepatoprotective if started within 8 Hours

1. if PCM taken in ***Staggered dose***
2. ***4 hour level above 100 or 15H level above 15mg/L***

- IV Given as slow infusion in 5% dextrose (150mg/kg in 250ml in 1 hour, then 50mg/kg in 500ml in 4Hr, then 100mg/kg in 1 Litre in 16 hours)

- ORAL 140mg/kg, then 70mg 6 hourly 17 doses

- Side effects - Nausea, vomiting, itching, Urticaria, Hypoglycemia, ANAPHYLAXIS, HYPOTENSION

- ***if minor side effects*** - stop, give Antihistamine and restart

- ***if Significant allergic reactions to acetylcysteine*** - (anaphylaxis, hypotension) – then METHIONINE oral can be used

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LIVER TRANSPLANT
```

- (Referral if INR above 2 @ 48 hours, or above 3.5 @ 72 hours)

1. ***pH*** below 7.3, after 24 Hours , or after resuscitation (or lactate above 3.5 after fluid resuscitation)

2. ***All three*** of (PT above 100, Creat above 300, Encephalopathy grade 3-4)

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TRANSPLANT IN OTHER POISONING
```

- 1. – INR above 6.5
- 2. – 3 of these 5
- age less than 11 or more than 40
- INR above 3.5
- bilirubin 300
- Jaundice to encephalopathy gap less than 7 days
- Non-A, Non-B Hepatitis, Idiosyncratic drug reaction

- – – – ***Drug toxicity DDs*** - *infection - Hepatitis, leptospirosis, Metabolic Encephalopathy, Ethylene Glycol*

BDZ OVERDOSE

- BDZ potentiate inhibitory affects of GABA by facilitating its binding to receptors ➡ Slurred speech, ataxia, Altered Mental Status

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        MANAGEMENT
```

- – Supportive and Flumezinil (though its not used commonly due to side effects like SVT, and seizure)

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PROPYLENE GLYCOL POISONING
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- it is diluent used in iv preparations of lorazepam and diazepam and it should be kept in mind that side effects after these iv injections could also be due to Propylene Glycol ➡ Tissue necrosis, hemolysis, Arrythmias, multiorgan dysfunction

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OPIOIDS POISONING

- opioids are AGONISTS at,

1. ***Mu receptors*** - Analgesia, Euphoria, bradycardia, GI dysmotility, Resp depression
2. ***Kappa Receptors*** - Hallucinations, Miosis
3. ***Delta receptors*** - Pain and mood

- – – – Opioid effects (pain relief and side effects like respiratory depression, addiction) are primarily due to agonistic effect on ***Mu Receptors***

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    FEATURES
```

- ***CNS*** – Lethargy, Sedation, altered sensorium, coma, Miosis

- ***Respiratory*** – Bradypnea, Hypoventilation, Apnea, Non-Cardiogenic Pulmonary Edema, Respiratory Arrest

- ***CVS*** – Bradycardia, Hypotension, Arrhythmias, Arrest

- ***GIT*** – Gastric aperistalsis (Nausea, Vomiting, Constipation)

- ***Others*** – Urinary retention, Pruritus, Flushing, Hypothermia

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MANAGEMENT
```

1. Scene safety and removal, stop the exposure
2. ***ABC before antidote***

- – fluids

3. Antidote ,– Acute - ***Naloxone*** 0.4-1mg - can repeat in 3-5 minutes (may need upto 20mg dose) – ***Target*** – Adequate Ventilation

- – – – ***if no iv access*** - give 2mg i.m
- – if Chronic/dependance - ***Naltrexone*** is given

TCA POISONING

- – Inhibit presynaptic reuptake of norepinephrine and serotonin
- – Acute ingestion more than 1gm causes severe toxicity
- – ingestion of 10-15mg/kg is life threatening
- – Elderly, underlying cardiac, renal or hepatic diseases are precipitating factors

1. ***CVS*** - Sinus Tachycardia, Long QT, VT/VF, Wide QRS, Brugada

- – – ***(hypotension is primary cause of mortality)***

2. ***CNS*** - Sedation, Seizures, Coma

3. ***Anti-cholinergic*** - Hyperthermia, Dry mouth, Flushing, dilated pupil, ileus, Urinary retention

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TOXICITY
```

- (cause receptor blockage)

- – ***Alpha Receptors blockage*** - ➡ Vasodilation ➡ Hypotension

- – ***Histamine receptors Blockage*** - Drowsiness, coma
- – ***Muscarinic receptors Blockage*** ➡ anticholinergic effects ➡ fever, tachy, Dry mouth, dry skin, dilated pupils
- – ***FAST SODIUM CHANNELS blockage*** - LONG QT, VT
- – ***URINARY RETENTION*** - distended Bladder

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TREATMENT
```

- ***Monitor*** - Cardiac monitor, Vitals, GCS, ABGs, Electrolytes
- ECG is the best predictor of severity
- ***Antidote*** – No specific antidote for TCAs

1. ABC
2. Oxygen
3. Saline bolus for hypotension

- – – ***refractory hypotension ➡give norepinephrine***

4. Activated charcoal - consider if ingestion time > 02 hours

- – – *Gastric Lavage - consider only if life threatening ingestion and presents within 1-2 hours*

5. Seizures control with BDZ

- – – Acidosis increases the risk of CVS and CNS toxicity hence ***MAINSTAY OF TREATMENT IS SODABICARB***
- ***Bolus*** – 1-2 mEq/kg iv push (and repeat if QRS remains wide)
- ***Infusion*** – 3 ampoules (= 150 mEq in 1000ml 5% Dextrose and give at rate of 150-250ml/Hour)
- – – ***Goal*** – keep pH 7.5-7.55, (when pH is above 7.55 ➡ stop infusion, and may restart when pH falls)

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INDICATIONS OF SODA BICARB
```

1. PH below 7.1
2. QRS more than 100
3. Arrythmias
4. Hypotension

- – refractory Arrythmias then can give iv Glucagon or MgSO4
- – – Can also consider lidocaine WITH CAUTION
- – keep pH on higher side - 7.5 to 7.55

- Neuroleptic Malignant Syndrome and Serotonin Syndrome

1. Hyperthermia (and sequelae like Rhabdomyolysis, DIC, AKI)
2. Tachypnea, Confusion, agitation, rigidity, Coma
3. Elevated CK, RFTs, Leukocytosis

- ***rigidity*** - Prominent feature in NMS but late and mild in SS
- ***Reflexes*** – Hypo or normal in NMS but Hyperreflexia in SS
- ***Clonus*** – no clonus in NMS but hallmark of SS
- ***Pupil*** – Normal in NMS but dilated in SS
- ***GI symptoms*** – common in SS
- ***Reaponse to BDZs*** – partial in NMS but dramatic in SS

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NMS
```

- Dopa is decreased
- Antipsychotics given (Haloperidol, Resperidone) or anti parkinson stopped
- ***Develops in days to weeks***
- Features like Parkinson - ***Ts*** Tone/(rigidity), Temperature (Hyperthermia), Tachycardia
- ***Normal reflexes, Normal pupil***
- Renal failure predicts mortality

```
MANAGEMENT
```

1. ***First line*** – for rigidity - BDZ
2. ***Second line*** – if no response to BDZ then Dantrolene is second line.

- – – *Dopamine agonists are also second line (Bromocriptine, amantadine)*

3. ***Third Line*** – Electro-conbulsive Therapy (ECT)

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SEROTONIN SYNDROME
```

- MAST drugs (MAO , Amphetamine, SSRI, Tramadol)
- ***Develop in less than 12 Hours***
- – (Think of features like pheochromocytoma) - Tachycardia, Hypertension, sweating, Flushing, Diarrhea, Hyperthermia
- – – ***hyperreflexia, Clonus and Extensor plantars, Myoclonus, Dilated pupil***

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MANAGEMENT
```

- Discontinue culprit drugs
- Supportive care
- ***First line*** are BDZs for agitation, rigidity and seizures
- ***Second line*** – Cyprohepatidine
- ***Third Line*** – chlorpromazine

WHEAT PILL

- Aluminum Phosphide
- – – *(some preparation have Zinc Phosphide which is toxic but comparatively less lethal - mortality 25-40% whereas Aluminum Phosphide mortality is more than 90%)*
- – – *Phosphine gas (hence garlic smell) is released on contact with moisture or acid in stomach ➡ Toxic effects inhibit cellular oxygen utilization and cause mitochondrial injury*
- ***GIT*** – Vomoting, Pain and GI Bleed, Pancreatitis
- ***CVS*** – Arrhythmias, circulatory shock
- ***Respiratory*** – Tachypnea, Hypoxia, Cyanosis

- ***CNS*** – irritability, Confusion
- AKI, Hematuria, Metabolic acidosis

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MANAGEMENT
```

- Supportive Care
- i.v fluids, Vasopressors, Inotropics
- consider Soda-Bicarb if pH is low
- MgSO4 - may have protective role against oxidative stress
- Ventilator support
- Consider Dialysis if renal failure or refractory acidosis

CYANIDE POISONING

- Insecticide, photographers, Fireman
- – – Blocks cytochrome oxidase C - inhibit cellular respiration - - no ATP - Histotoxic Hypoxia

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PRESENTATION
```

- ***with inhalation*** – symptoms appears quickly, within minutes
- ***with ingestion*** – onset of symptoms may be from minutes to hours
- Brick red skin, Almond smell
- ***CNS*** – headache, confusion, seizures, DILATED PUPILS, coma
- ***Respiratory*** – Tachypnea early, then bradypnea, Hypoxia, respiratory arrest
- ***CVS*** - Hypertension earlier, then Hypotension, Arrhythmias, CVS Collapse, Cardiac arrest
- ***GIT*** – Nausea, vomiting, Cramps
- ***Severe lactic acidosis***

- Chronic – Ataxia, Neuropathy, dermatitis

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TREATMENT
```

- ***Monitor*** – continuous cardiac monitor, Vitals, Pulse oximetry, ABGs, Lactate levels

1. Scene safety, rescue from scene, decontamination (e.g. remove cloths)
2. ABC and supportive care

- 100 % oxygen, Airway management (if needed, intubate), iv fluids, if hypotension then give Vasopressors

3. ***First line antidote*** - HYDROXOCOBALAMIN (Cyanokit) – adult dose 5gram i.v in 15 minutes and may repeat once.
4. ***Second line*** - if Hydroxocobalamin unavailable – SODIUM NITRITE – adult dose 300mg i.v in 2-4 minutes
5. ***Adjunctive therapy*** – (with HYDROXOCOBALAMIN or SODIUM NITRITE) – 12.5 gram i.v
6. ***Amyl nitrate*** – is pre hospital temporizing measure

- ALTERNATIVE FIRST LINE ANTIDOTE ***DICOBALT EDETATE***

CO POISONING

- Firesmoke inhalation, Malfunctioning heating systems, Vehicle exhaust in close space (Garages), Industrial exposure in foundaries and mining blast fumes, Heaters in winter

- Saturation normal but Oxygen partial pressure is low (because pulse oximeter can't differentiate between oxy and decarboxyhb and sense it as normal saturation)

- ***Cherry Red skin, Pink mucosa***

- ***CNS*** – Headache, vertigo, confusion, seizures, Coma

- ***CVS*** – Chest pain, palpitations, Hypotension, Arrhythmias

- ***Respiratory*** – Tachypnea, Non-Cardiogenic Pulmonary Edema, respiratory arrest

- ***RENAL*** – AKI, Proteinuria

- ***Hematological*** – Leukocytosis, TTP, DIC

- ***Musculoskeletal*** – Rhabdomyolysis
- Lactic acidosis, Nausea, vomiting

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CARBOXYHEMOGLOBIN
```

- – Pulse oximetry is unhelpful
- – Levels quickly improve with Oxygen therapy and levels measured after oxygen therapy may not relate with toxicity
- – Level - above 3 is significant in non smokers (above 10 in smokers), ***Above 30 is severe***

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TREATMENT
```

1. Scene safety, removal
2. MONITOR

- Check levels
- Check ABGs and CO Oximetry, ECG
- Serum Lactate

3. ABC and supportive care
4. 100% Normobaric Oxygen, and supportive care

- ***Indications of Hyperbaric oxygen*** - Coma, MI, PREGNANCY, EXTRAPYRAMIDAL FEATURES, Carboxyhemoglobin Level above 25%
- – – – (***Antidote*** – not available in most countries – ZINC BISVINYLIMIDAZOLE DIACETATE)

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METHEMOGLOBINEMIA
```

- When Ferrous iron in hemoglobin is oxidized to Ferric iron.
- can be due to anesthetics, Antibioticss, antimalarials, Industrial alanine dyes
- Less than 10% is usually asymptomatic
- Cyanosis appears when it is more than 10% (Pathognomonic ***Chocolate brown blood***)
- More than 50% ➡ high likelihood of Seizures, Arrhythmias, Coma
- Cyanaosis and low Oxygen saturation with normal PaO2

- Normal po2 with met Acidosis

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MANAGEMENT
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- Remove causative agent
- Give 100% Oxygen
- Supportive Care – i.v line, Cardiac monitoring, Treat seizures if present
- ***First line antidote*** – METHYLENE BLUE 1-2mg/kg i.v in 5 minutes (and may repeat once after 1 hour)
- – – – INDICATIONS – methemoglobinemia above 20-30% (or at lower level if symptomatic
- ***Second line Antidote*** – (if methylene blue unavailable) – ASCORBIC ACID 1-2 gram i.v (Vitamin C)
- ***RESCUE THERAPY*** – Exhange transfusion and consider hyperbaric oxygen in refractory cases

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OP POISONING

- Cholinesterase inhibitor - increase acetylcholine levels
- for treatment - cholinesterase activator - Pyridostigmine
- ***High risk groups*** – Farmer, pesticide and insecticide handlers

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FEATURES
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1. ***Muscarinic*** – *(Parasympathetic)* - **SLUDGE** (Salivation, Lacrimation, Urination, Diarrhea, GI Cramps , Emesis) and Miosis, bradycardia, Hypotension
2. ***Nicotinic and Musculoskeletal*** - Muscle fasciculations, cramps, tachycardia, hypertension, Dilated pupils
3. ***CNS*** – confusion, agitation, seizures, Coma
4. ***CVS*** – bradycardia is muscarinic effect, Tachycardia is nicotinic effect

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INVESTIGATION
```

- ECG - Torsades de ponte
- CXR - Aspiration
- OXIMETRY

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MONITORING
```

- Cholinesterase activity
- Heart Rate

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TREATMENT
```

1. Scene safety and decontamination
2. Wear PPE
3. ABC and Supportive Care - i.v fluids, Vasopressors for Hypotension, BDZs for seizures
4. ***MUSCARINIC ANTIDOTE IS ATROPINE*** – *(Reverses muscarinic effects, not nicotinic effects)*.
5. ***NICOTINIC ANTIDOTE IS PRALIDOXIME*** (CHOLINESTERASE ACTIVATOR)

- – – – Improves nicotinic symptoms - (neuromuscular symptoms)
- – – – IN ADDITION TO ATROPINE, GIVEN ASAP, Early administration is critical
- – – – 2gm stat in 30 minutes then continuous infusion at 500-750mg/hour for 3-7 days

6. if Develop torsades - MgSO4 is given

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ATROPINIZATION
```

- Target is DRYING OF RESPIRATORY SECRERIONS , aiming to clear bronchorrhea and crackles
- Heart rate above 80 but this is secondary sign
- pupil dilation is not a reliable sign
- – – – *(EVEN IF HEART RATE IS UPTO 150, SHOULD GIVE ATROPINE - GIVE IN DILUTIONAL FORM)*

- – – – Atropine bolus, (initial 2-4mg, which is doubled after every 5 minutes if target not achieved), are given till *ATROPINIZATION* and after achieving the target, start i.v infusion (typically infusion dose per hour is 10-20% of total dose needed for achieving Atropinization)

- Theoretically, in OP poisoning, we can not ***Over Atropinize*** the patient. Massive doses are required and should be aggressive. ***In severe cases, Atropine total dose needed may be in Grams***

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DRUGS TO AVOID
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- Frusemide - will ppt Arrhythmias, dehydration

- Beta Blockers - bradycardia risk

- Aminoglycosides - cause neuromuscular blockade, and prolong QT

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DDs
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- Over treatment of Cholinergic crisis

- NMS, Serotonin syndrome, Amphetamine, Nicotine Toxicity

- Botulism

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SYNDROMES in OP Poisoning
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1. ***Intermediate Syndrome***

- Develops in 20% of hospitalized patients, in 1-4 days and improve in 2-3 weeks – *(proximal muscle weakness, Cranial Nerve palsies, respiratory muscle paralysis)*

2. ***Delayed neuropathy*** - develops after 2-4 weeks – *(Axonal neuropathy, distal weakness, sensory loss)*
3. ***Long term*** – develop after months – *(cognitive impairment, Parkinsonism)*

LEAD POISONING

- BATTERY WORKER, Mining, Foundaries, PAINTER, Old housing

1. ***Blood*** - Anemia, basophilic stippling
2. ***CNS*** - Headache, Memory loss,

3. ***Motor neuropathy*** – foot drops, wrist drop, flaccid paraparesis

- – – – *Lead Neuropathy is predominantly motor* - wrist drop, foot drops (Arsenic NP is mixed)
- Blue lines on gums
- Hyperkalemia due to RTA 4

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INVESTIGATIONS
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- CBC with Peripheral film
- serum lead Level (toxicity comfirmed if it is above 3.5 microgram/dl)
- CT BRAIM – *(if Encephalopathy, seizures, focal deficit)*

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TREATMENT
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- Nutritional support with Iron, Calcium, Zinc, and Vitamin C
- ***Chelation therapy*** – is specific treatment, but usually not indicated for mildly elevated levels

1. Succimer - (DMSA) – Oral – specifically for children
2. Combined treatment with Dimercaprol and Calcium disodium EDTA

- – – – Dimercaprol given first, then Calcium Disodium EDTA at a different site
- – – – ***Dimercaprol*** i.m - 4-5 mg/kg i.m 4 Hrly for 5 days
- – – – ***Calcium Disodium EDTA*** – i.m or i.v 75mg/kg/Day for 5 days

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DDs
```

- AIP - psychiatric symptoms
- FMF - recurrent serositis
- Lead Poisoning
- Mercury neuropathy is mixed
- Arsenic
- All causes of flaccid paraparesis

ARSENIC POISONING

- pesticides, rusted pipes,

1. ***Acute*** – (within minutes to hours afters exposure)

- GI features are most common. vomiting, pain, Rice-Water diarrhea, Bloody Diarrhea
- Hypotension,
- Cough, Dyspnea, Chest pain

2. ***Subacute*** – (1-3 weeks after exposure)

- Sensorimotor neuropathy
- Cytopenias
- ***Mee lines*** - transverse white lines on nails

3. ***Chronic*** – (Months to years after exposure)

- Dermatological features are hallamrks – Hyperpigmentation (raindrop appearence), HYPERKERATOSIS OF PALMS AND SOLES

- Neuropathy

- Hypertension

- Portal hypertension, Liver cirrhosis

- Bone marrow suppression

- cancer risk

```
MANAGEMENT
```

- ***chelation therapy*** is specific treatment

1. Scene safety and removal
2. ABC and supportive care – e.g. for neuropathic pain, seizures and hemolysis
3. GI Decontamination if recent exposure – Lavage, whole bowel irrigation
4. ***Dimercaprol*** is first line
5. ***Succimer*** – (DMSA) – oral chelator

- – – severe cases may need sequential or combination chelation therapy with Dimercaprol and Succimer

6. Dialysis – indicated if renal failure or if RFTs are impaired

MERCURY POISONING

- ***inhalation*** — CLASSIC TRIAD of Coarse teemors + shyness/social withdrawal + Gingivitis

- ***Chronic dietary exposure*** – Paresthesia, dysarthria, Ataxia, tunnel vision and hearing problem

- ***Systemic effects*** – (regardless if exposure is by inhalation or dietary) – Cardiomyopathy, Anemia, Autoimmune disorders, Thyroid dysfunction

```
MANAGEMENT
```

1. Scene safety, source removal, decontamination
2. ABC and supportive care
3. Chelation

- – with ***DIMERCAPROL***
- – or with ***SUCCIMER***

4. Dialysis – if impairment of RFTs

ALCOHOL

- BDZ in withdrawal
- Disulfiram for abstinence - inhibit acetaldehyde dehydrogenase - unpleasant features headache nausea flushing
- Acamprosate for abstinence
- – Metabolism
- Alohol - Acetaldehyde (by alcohol dehydrogenase - Acetate (by Acetaldehyde dehydrogenase)
- Methanol - Formaldehyde (by alcohol dehydrogenase) - Formic Acid (by aldehyde dehydrogenase) – Formate causes severe metabolic acidosis and snow field cataract
- – ***High Anion scenario in Alcohol use***
- Methanol
- Ethylene
- pancreatitis
- liver failure

ALCOHOL WITHDRAWAL

- ***Chronic alcohol use*** ➡ increases GABA and inhibits NMDA-glutamate receptors
- Withdrawal - opposite happens
- **Symptoms**
- start at 6-12 H
- ***12 Hours *** - Hallucinations - *(auditory, Visual, Tactile)*
- ***36 Hours*** - Seizures peak 36H
- ***72 Hours*** - Delirium - give oral lorazepam as 1st line.
- – palpitations, Nausea, Vomiting, *Sweating, flushing, Hyperthermia, tachypnea, DILATED PUPIL*
- ***Treatment***
- BDZ are most effective
- Carbamezipine is acceptable alternate
- Will also need Thiamine

WERNICKE

- – mnemonic **CAN**
- Confusion (Enceph)
- Ataxia
- Nystagmus, LR palsy, Conjugate gaze palsy
- – Areas involved are Peri aqueductal, Periventricular, Subthalamic, Mammillary
- – ***Investigation*** - Red cell emzyme transketolase
- give iv thiamine
- reversible if given thiamine in time. otherwise progress to Korsakoff, has confabulations
- – Dextrose depletes thiamine - should never be given before Thiamine

ETHYLENE POISONING

- ***involves kidney***
- antifreeze, mechanic, suicidal
- – Stages

1. like alcohol intoxication - confusion, slurring, coma
2. HAGMA , hyperventilation, Hypocalcemia, Tachycardia, Hypertension
3. Deposition of Calcium Oxalate crystals around 12 H – Renal - stones, respiratory, cardiac failure

- – **(TREATMENT)**
- Ethanol
- Fomepizole
- Dialysis

METHANOL POISONING

- (***Involves Eyes***)
- more than 30mg
- HAGMA with high Osmolar Gap, Vision symptoms
- Alcoholic, bing drinking ➡ Confusion, headache, *CEREBELLAR symptoms, DECREASED VISION WITH POORLY REACTIVE PUPIL*
- – Features of alcohol intoxication + HAGMA with high Osmolar gap
- – Retinal injury + Optic neuropathy
- ***INVESTIGATIONS***
- Eye examination
- CBC, RFTs, LFT, Amylase, MRI
- ABGs
- Visual Evoked Potentials for neuropathy
- ***TREATMENT***
- Supportive, admit, Fluids, bicarb
- Pyridoxine, Thiamine
- Seizures - Diazepam
- – Fomepizole or Ethanol (delays methanol metabolism and excretion)
- – Folic Acid
- – Dialysis (if low GCS, methanol above 0.5gm, Renal or Visual impairment, Acidosis not correcting with bicarb)

COCAINE

- ***CVS*** - HTN, Brady or tachy, MI, dissection, long QT
- ***CNS*** - Dilated pupil, hypertonia, hyperreflexia, seizures
- Hyperthermia, Rhabdomyolysis , Met Acidosis, renal failure
- ***Management***
- BDZ are 1st line
- Chest pain - BDZ + GTN - PCI
- HTN - CCB
- Avoid BB, because then unopposed alpha activity will cause further vasospasm

AMPHETAMINE

- Features are same like cocaine , BP, Chest pain
- management options include Nitrates, BDZ , PCI

ECSTASY *(MDMA)*

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FEATURES
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- ***CNS*** - Anxiety, confusion, ataxia, *DILATED PUPIL*
- ***DIC*** , Rhabdomyolysis - Renal failure
- ***CVS*** - high rate high BP
- Hyperthermia, Hyperventilation
- ***HYPONATREMIA*** - MDMA stimulate ADH - less urine output - meanwhile too cool down Hyperthermia pt drink excess water ➡ Hyponatremia

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TREATMENT
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- supportive and ***DANTROLENE***

SMOKING CESSATION

- Nicotine replacement therapy

1. ***Vernicillin*** - partial agonist of nicotine receptors

- started 1 week before target date of smoking cessation - given for 12 weeks
- Can’t give in pregnancy or nursing

2. ***Bupropion***

- nicotinic antagonist
- started 2 weeks before target date of smoking cessation
- can’t give in pregnancy nursing or epilepsy
- ***pregnancy***
- cognitive behavioral therapy, motivation support
- nicotine replacement therapy.

BETA BLOCKERS TOXICITY

1. Resp - Wheezing, Spasm
2. CVS - brady, hypotension
3. CNS - delerium, seizures
4. Metabolic - Hypoglycemia

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MANAGEMENT
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- Fluids, Nebulize
- Atropine
- Iv glucagon
- Lipid emulsion Therapy

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    DDs
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- Shock
- Organophosphate poisoning
- Digoxin toxicity

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1. **Acidosis with high lactate*** - Metformin, Ferrous sulphate, Cyanide, carbon monoxide
2. ***Methanol*** - HAGMA with high Osmolar gap,
3. ***Mutlidose activated charcoal*** used in - Carbamezipine, Dapsone, Phenobarbitone, Quinine, Theophylline
4. ***Whole Bowel Irrigation*** used in - Ferrous, Lithium, Drug packets
5. ***SODA BICARB*** used in - Salicylates, TCA
6. ***Mucosal ulceration*** feature of - Paraquat poisoning

ANTIDOTES/MAINSTAY OF TREATMENT

- BDZ - Flumezinil
- OPIOIDS - Naloxone

- TCA - Bicarb
- CYANIDE - DiCobalt EDETATE
- CO - 100% or Hyperbaric oxygen
- BB - Atropine, Glucagon, Lipid emulsion
- OP - Atropine, Pralidoxime
- Lithium - bicarb, dialysis
- Ethylene - Ethanol, Fomepizole
- Methanol - Ethanol, Fomepizole
- Salicylate - bicarb, dialysis
- Paracetamol - acetylcysteine/methionine, Transplant